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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/520,932

08/23/2005

Michael Numminen

3670-56

4775

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EXAMINER

LIU, HARRY K

ART UNIT

PAPER NUMBER

3662

MAIL DATE

DELIVERY MODE

08/01/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

**Office Action Summary**

Application No.

10/520,932

Applicant(s)

NUMMINEN, MICHAEL

Examiner

Harry Liu

Art Unit

3662

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 12 June 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

Receipt is acknowledged of applicant's amendment filed (06/12/2007). Claims (1-13) are pending and an action on the merits is as follows.

Applicant's arguments with respect to claims (1, 7, 13 ) have been considered but are moot in view of the new ground(s) of rejection.

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**DETAILED ACTION**

***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

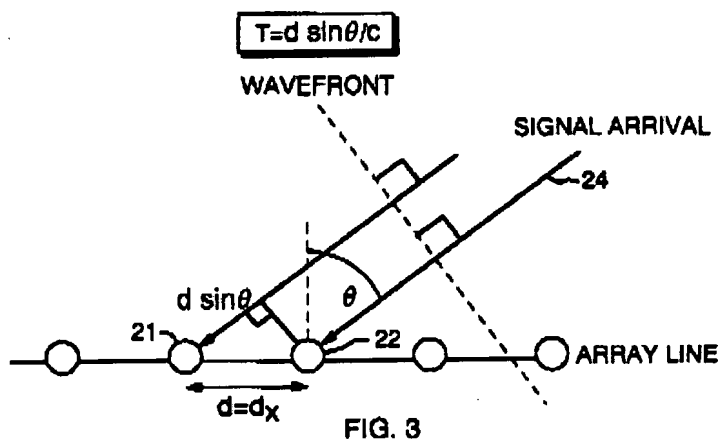
(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-4, 7-10, 13, are rejected under 35 U.S.C. 103(a) as being unpatentable over Robbins (US Patent 5973638) in view of Fletcher (US Patent 4119972).

Regarding claims 1, 7, 13, Robbins discloses a smart antenna/antenna array channel simulator and test system with correlated effects for verifying the integrity (calibrate) of a smart antenna system by extracting the temporal (different time intervals) and spatial information of the signals of interest (main beam instead of side lobe) (Abstract). The signals that are received on the different elements of the antenna array are combined to form a single output (the first value). The direction in which the array has maximum response (maximum point/gain) is said to be the beam pointing direction (column 7, lines 15-25). The signal received over time at the different antenna

elements of the array are weighted (column 8, lines 25-27). Robbins discloses using computer program (the software or processor for controlling) (column 28, lines 9-15).

Robbins does not specifically disclose the method of rejecting all values outside of the first range or turning off antenna element. However, Fletcher teaches turning off antenna element (column 7, lines 27-32). It would have been obvious to modify Robbins' antenna test system by individually turning off each antenna array to find the nulls and by turning off in between arrays to find the sweet overlap of main beams (only outermost antenna remain) in order to get an antenna system that would transmit or receive signals mainly on main lobe instead of falling on side lobe.



Regarding claims 2,8, Robbins as modified by Fletcher discloses antenna array with weighting (column 7, lines 16-30) and finding maximum range between beams. Note that finding maximum angle between beams is equal to turning off interadjacent elements and leave only two outermost element remain.

Regarding claims 3, 4, 9, 10, Robbins discloses the direction in which the array has maximum response is said to be the beam pointing direction. Thus, this is the

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direction in which the array has maximum gain (column 7, lines 15-25). This is finding the maximum point for the corresponding angle on main lobe. The A/D converter for converting analog to digital is used (see Fig. 9A below) for converting analog signals to digital signals.

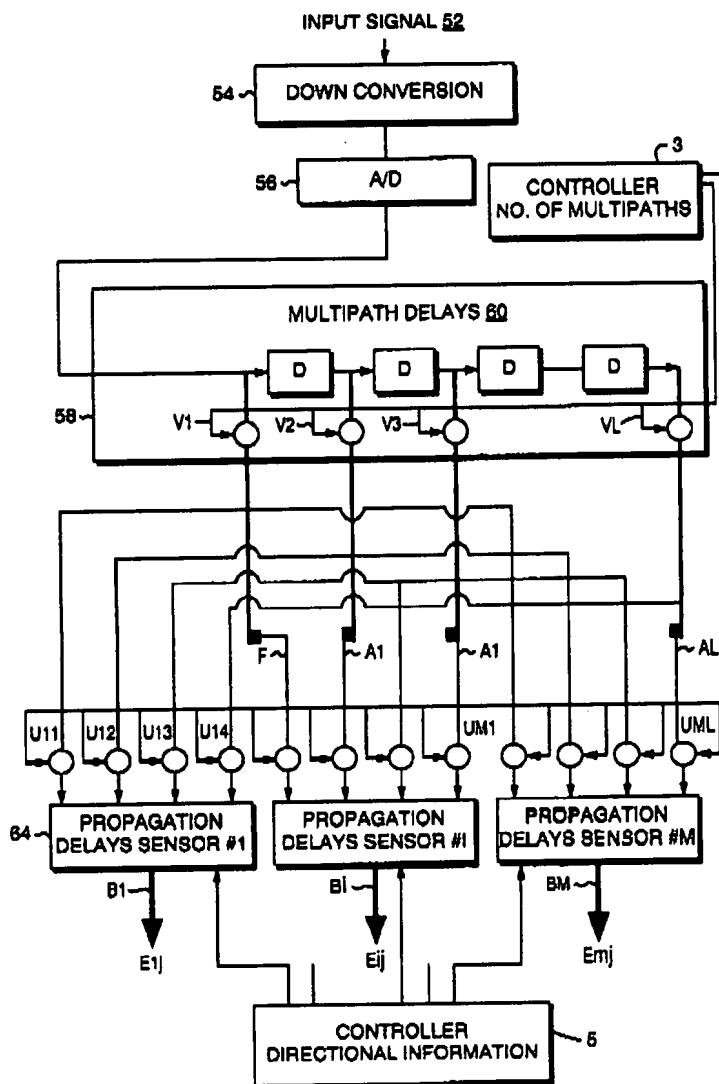


FIG. 9A

3. Claims 5-6, 11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Robbins (US Patent 5973638) in view of Fletcher (US Patent 4119972), as applied to claims 1 and 7, and further in view of Derneryd (6351243).

Regarding claims 5-6, 11-12, Robbins as modified by Fletcher discloses all claim limitation, as applied to claim rejection for claims 1 & 7 above, except for producing a radiation diagram from the values and have a relative distance such that no grating lobes (7) will occur when using all elements in a full array.

However, Derneryd discloses a sparse array antenna with sparse element grid in a one-dimensional scanned array or multi-beam array for finding the distance between elements in order to generate no grating lobe (Abstract). The steps of producing radiation pattern/diagram are described (column 4, lines 35-57) and the distance of elements is also described (column 2, lines 1-5). It would have been obvious to further modify Robbins by producing radiation diagram from the value (amplitude) at corresponding angle and the distance between elements with no grating lobe in order to get an array antenna system that is capable of accurately radiates/receives signals while reducing undesired signals.

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***Response to Arguments***

Applicant argues for claims 1, 7 and 13 that neither U.S. patent 5973638 or 6351243 discloses/teaches turning antenna elements off. A new reference by Fletcher has been applied to answer this specific argument.

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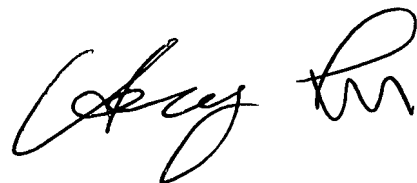
***Conclusion***

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Harry Liu whose telephone number is 571-270-1338. The examiner can normally be reached on Monday -Thursday and every other Friday..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas Tarcza can be reached on 571-272-6979. The fax phone number for the organization where this application or proceeding is assigned is 571-270-2338.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Harry Liu  
Examiner  
Art Unit 3662  
July 21, 2007



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